

Appl. No.: 10/620,186
Response to Office Action dated: May 15, 2006
Reply to Office Action of: February 17, 2006

REMARKS/ARGUMENTS

Reconsideration and allowance of the above-referenced application are respectfully requested.

Claims 1-18 are pending. Claims 1-18 are rejected under 35 USC 103(a) as being unpatentable over Schwab et al, US Patent No. 6,271,430, in view of admitted prior art. The Office Action asserts that the differences between Schwab and the claims of the present application are that (1) Schwab does not disclose the recovery of isobutylene after the autometathesis reaction, and (2) Schwab does not disclose the ratio of external fresh ethylene to the n-butenes in the C₄ olefin stream. The Office Action then alleges that it would have been obvious to modify the Schwab process by removing the isobutylene from the autometathesis process before recycling recovered butenes. The Office Action further asserts that it is obvious to modify Schwab by selecting the appropriate amount of ethylene feed to the "second metathesis reaction." The applicant respectfully disagrees.

In the "first metathesis" step of Schwab, 1-butene and 2-butene are reacted to give propene and 2-pentene (col. 2, lines 40-44). There is no mention of any reaction of isobutylene with n-butene. Thus, the "first metathesis" as defined by Schwab neither discloses nor suggests a reaction of n-butenes with isobutylene to form propylene.

In contrast, "autometathesis" as this term is defined in the present specification includes not only the reaction of 1-butene with 2-butene and the reaction of 1-butene with 1-butene, but also includes the reaction of 2-butene with isobutylene and the reaction of 1-butene with isobutylene. The use of the term "autometathesis" in claims 1 and 15 therefore includes, by definition, reactions of n-butenes with isobutylene. The applicant should not be required to insert the definition of autometathesis into the claim when this definition is clearly stated in the specification. Thus, the term "autometathesis" as it is used in the claims of the present application is different from the "first metathesis" described in Schwab.

In Schwab, the exemplary feed to the first metathesis step contains "at most 1-2% by weight of isobutylene." By using the term "at most" Schwab is teaching away

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from the inclusion of isobutylene in the feed to the first metathesis reactor. There is no disclosure or suggestion in Schwab that it would be desirable to include isobutylene in the first metathesis step, because, according to Schwab, the only reaction of significance that is taking place in the first metathesis step is the reaction of 1-butene with 2-butene to form propene and 2-pentene (col. 3, lines 41-42). The other reactions acknowledged by Schwab produce a small proportion of 3-hexene and ethene, as well as small amounts of higher-boiling compounds (col 3, lines 42-44). If Schwab were to add an isobutylene removal stage, it would be added upstream from the first metathesis reaction, as is evident from the use of the word "at most" 1-2% by weight isobutylene. Thus, there is no teaching or suggestion in Schwab that would cause one of ordinary skill in the art to modify the Schwab process by adding an isobutylene stage downstream from the first metathesis reactor.

Independent claims 1 and 15 provide that for the feed to the downstream metathesis reactor, "the molar ratio of said external fresh ethylene to the n-butene in said C4 olefin stream is from zero to 0.8." In Schwab, the downstream metathesis reaction involves the reaction of 2-pentene with ethene to give 1-butene and propene. There is no teaching or suggestion in Schwab of a downstream metathesis reaction involving ethylene and n-butenes. Overall, there is no disclosure or suggestion in Schwab that the reactions disclosed therein produce "additional propylene" as is produced in accordance with the embodiments disclosed and claimed in the present application (see step g of claim 1 and step h of claim 15). Thus, Schwab does not render obvious claims 1 and 15 of the present application.

Dependent claims 2-14 and 16-18 are believed to be patentable for the same reasons as independent claims 1 and 15.

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In view of the above, it is believed that this application is in condition for allowance, and such a Notice is respectfully solicited.

Respectfully submitted,

Robert J. Gartside et al.

By: Diane F. Covello
Diane F. Covello
Registration No. 34,164
Alix, Yale & Ristas, LLP
Attorney for Applicant
Telephone: 860-527-9211

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750 Main Street
Hartford, CT 06103-2721
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